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Case Report

Bilateral abducens nerve palsy during treatment of a pediatric brucellosis

Pediatric neurobrucellosis

Ummuhan Cay[1], Emine Kocabas[2], Ceren Cetin[3], Gulperi Timurtas Dayar[4], Gulen Gul Mert[5], Filiz Kibar[6],

[1]Department of Pediatric Infectious Diseases, Adana City Research and Training Hospital, Adana, [2]Department of Pediatric Infectious Diseases, Cukurova University, Adana, [3]Department of Pediatric Infectious Diseases, Kocaeli Research and Training Hospital, Kocaeli, [4]Department of Pediatric Infectious Diseases, Antalya Research and Training Hospital, Antalya, [5]Department of Pediatric Neurology, Cukurova University, Adana, [6]Department of Microbiology, Cukurova University, Adana, Turkey

Abstract

Brucellosis is a multisystemic zoonosis caused by the bacteria of the genus Brucella particles or direct contact with infected animal parts. Due to the involvement of various organ systems, its clinical spectrum is wide. Neurobrucellosis occurs in 3-13% of all brucellosis cases and rarer in children. Involvement of various cranial nerves may be seen very rarely as a component of neurobrucellosis. We present here a case of a 3-year-old girl with sixth cranial nerve palsy that occurred during treatment for brucellosis. Our patient is the first pediatric neurobrucellosis case with isolated 6th nerve palsy in English-language literature. Neurobrucellosis should be considered in the differential diagnosis of patients of any age with unexplained neurological symptoms living in endemic regions

Keywords

Pediatric; Neurobrucellosis; Abducens Nerve Palsy

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Corresponding Author: Ummuhan Cay, Department of Pediatric Infectious Diseases, Cukurova University, Adana, Turkey.
GSM: +905054940831 E-Mail: ucay-1205@hotmail.com

Introduction

Brucellosis is a multisystemic zoonosis caused by the bacteria of the genus Brucella. It is a worldwide health concern but endemic in certain geographic parts of the world such as the Mediterranean countries, Central Asia, Middle East and certain regions of South America. Brucellae are facultative intracellular, non-motile, Gram-negative coccobacilli. Transmission is through consumption of unpasteurised milk and milk products, inhalation of infected aerosolised particles or direct contact with infected animal parts [1] . Due to the involvement of various organ systems, neurobrucellosis occurs in 3-13% of all brucellosis cases. Neurobrucellosis can have a variety of clinical and radiological manifestations such as acute, subacute or chronic meningitis, meningoencephalitis, meningovascular complications, multifocal white matter disease, intradural or epidural abscesses, arachnoiditis, ruptured mycotic aneurysm, hydrocephalus, presudotumor cerebrii, parkinsonism, polyradiculopathy (especially lumbosacral), mononeuropathy, compressive myelopathy due to spondylitis, cerebellar syndrome, calcification in basal ganglia, 2nd, 6th, 7th and 8th cranial nevre palsies [2-4] .

Involvement of various cranial nerves may be seen very rarely as a component of neurobrucellosis.We present here a 3-year-old girl with sixth cranial nerve palsy that occurred during treatment for brucellosis.

Case Report

She was initially admitted to another hospital 10 days before admission to our clinic with fever, vomiting, fatigue . On the fifth day of treatment, patient was referred to our clinic because of developing bilateral strabismus. Her personal history revealed that they as a family consumed cheese prepared from unpasteurized milk and that her grandmother had received treatment for brucellosis too. Her physical examination was normal except findings of bilateral abducens nerve palsy. she developed strabismus, she was unable to fixate her eyes on anything and she had difficulty reaching objects and grasping them. Her blood leukocyte count was 15.200/mm3 (the differential 44% neutrophiles, 52% lymphocytes, 4% monocytes), hemoglobin 11.2 gr/L, thrombocyte count 369.000/mm3, erythrocyte sedimentation rate 23 mm/hour and C-reactive protein level was 4.8 mg/dl (0-5 mg/dl). Her blood chemistry was normal. Serum agglutination test was positive for Brucella at 1/320. Her blood culture was negative. Her personal history revealed that they as a family consumed cheese prepared from unpasteurized milk and that her grandmother had received treatment for brucellosis too. The patient was diagnosed with neurobrucellosis due to evident brucella infection and concurrent 6th nerve palsy. She was started on trimethoprim-sulphametoxazole, rifampicin, cephtriaxone and gentamicin. She was consulted with ophthalmology department. She had no papillary stasis on fundus examination. Her examination was normal except findings of bilateral abducens nerve palsy. Cranial Magnetic Resonance Image (MRI) was normal. Lumbar puncture was performed. The cerebral spinal fluid (CSF) was colorless. Microscopic examination of CSF showed 10 cells per mm3. CSF glucose and protein levels were normal. CSF culture abd brucella agglutination tests yielded negative results. After three days of treatment, her eye movements were completely normal. Her family was screened for brucellosis too. Her mother and 13-month-old brother had brucellosis too and were given treatment. She was hospitalized for two weeks and sent home with oral rifampicin and Trimethoprim Sulfamethoxazole (TMP-SMX) treatment due for 3 months. She was complaint-free and her physical examination was normal at one-month follow-up visit.

Our patient is the first pediatric neurobrucellosis case with isolated 6th nerve palsy in English-language literature. Neurobrucellosis should be considered in the differential diagnosis of patients of any age with unexplained neurological sypmtoms living in endemic regions.

Discussion

Brucellosis is an infectious disease with a wide clinical spectrum that can involve any organ system in human body. Neurobrucellosis is the involvement of central nervous system in brucellosis. It is either due to direct invasion by bacteria or autoimmune reactions to bacterial toxins [5,6]. Neurobrucellosis can present itself in various clinical manifestations as acute, subacute or chronic meningitis, meningoencephalitis, meningovascular complications, multifocal white matter disease, intradural or epidural abscess, arachnoditis, ruptured mycotic aneurysms, hydrocephalus, parkinsonism, polyradiculopathy (especially lumobosacral), mononeuropathy, compressive myelopathy due to spondylitis, myelitis, cerebellar syndrome, calcification of basal ganglia, 2nd, 6th, 7th, 8th cranial nerve palsies [1,7,8]. Isolated cranial nerve involvement is especially rare, with 7th cranial nerve being the most common [9,10]. 6th cranial nerve is the most frequently involved cranial nerve in case reports from Turkey, followed by 7th and 8th [11,12]. There are a few case reports of isolated cranial nerve involvement due to brucellosis in adults in the literature [13-16].

Neurological complications of brucellosis in adults have been classified in two groups. The first is an acute toxic-febrile state, usually non-specific (e.g. headache and neuropsychiatric manifestatios) that occur in systemic (bacteraemic or Brucella serological tests are positive) forms of the disease, and the second is that of actual invasion and localization of the pathogen in the CNS [9] . Our case seemed to be in the first group because she had high grade fever, vomiting and fatigue when 6th cranial nerve palsy developed, although the pathogen could not be shown in cerebrospinal fluid. In a case published by Yılmaz et al, the patient developed 6th nerve palsy on the eleventh day of treatment and no pathogen could be shown in CSF [13]. The inability to show any pathogen in CSF may be due to patients having received treatment in advance.

Brucellosis is diagnosed by either serological tests and/or culture positivity. Neurobrucellosis is diagnosed by showing the pathogen in CSF culture, the presence of antibodies in CSF and presence of meningeal involvement [17]. But it is not always possible to show the pathogen in CSF. Ceran et al. have taken four criteria into consideration for diagnosis of neurobrucellosis in a study of 18 patients. These criteria were presence of neurological symptoms in the absence of another disease, isolation of bacteria from blood and other body, positivity of standard tube agglutination (STA) titers in serum and/or cerebrospinal fluid (CSF) and presence of CSF findings revealing chronic meningitis (lymphocytic pleocytosis, increased protein level, decreased glucose level). Presence of any of these four criteria was sufficient for the diagnosis [18]. In our case clinical history, symptoms and laboratory findings with the presence of 6th cranial nerve palsy supported the diagnosis of neurobrucellosis. However, CSF agglutination test and culture were both negative.

There is no consensus on optimal treatment regimen of neurobrucellosis. Different antibiotic combinations and durations

of treatment were reported in different studies. Treatment with combinations of two or three antibiotics for at least three months is advised. Rifampicin, TMP-SMX, ceftriaxone and aminoglycosides are the preferred antibiotics as combinations [17,18] .

Our patient was diagnosed with brucellosis under the light of clinical history, physical examination findings and laboratory results. Accompanying 6th nerve paly led to the diagnosis of neurobrucellosis. The patient was given ceftriaxone, rifampicin and TMP-SMX. Ceftriaxone treatment was continued for fourteen days. Rifampicin and TMP-SMX combination treatment was planned to be continued for a total of three months. On first month follow-up, the patient was free of any complaints.

Neurobrucellosis is rare in adults, but even rarer in children. And there are a few adult cases with abducens nerve palsy due to neurobrucellosis, but no pediatric cases. Our patient is the first pediatric neurobrucellosis case with isolated 6th nerve palsy.

Finally, neurobrucellosis should be considered in the differential diagnosis of patients of any age with unexplained neurological sypmtoms living in endemic regions.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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